REMARKS

This Amendment is submitted in response to the final Office Action mailed on March 24, 2009. No fee is due in connection with this Amendment. The Director is authorized to charge any fees which may be required, or to credit any overpayment to Deposit Account No. 02-1818. If such a withdrawal is made, please indicate the Attorney Docket No. 112857-470 on the account statement.

Claims 36 and 38-51 are pending in this application. In the Office Action, Claims 36 and 38-51 are rejected under 35 U.S.C. §112, first paragraph, and under 35 U.S.C. §103. In response, Claims 36, 39, 41 and 49-51 have been amended for clarification purposes. These amendments do not add new matter. At least in view of the amendments and/or for the reasons set forth below, Applicants respectfully submit that the rejections should be withdrawn.

As mentioned above, each of the claims was rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. In particular, the Examiner noted that: "the limitation of 'at least substantially' uncured pressure sensitive adhesive layer appears to be new matter ... [s]upport for this claim language could not be located in the current specification ... [t]he drawings do not provide support for an 'at least substantially' uncured pressure sensitive adhesive layer ... [c]larification is required." (See, Office Action, pg. 2). It appears from the Examiner's comments on page 28 of the Office Action, that the Examiner has interpreted the prior claim amendments to encompass a case where a portion (i.e., less than all) of the pressure sensitive adhesive layer is in at least substantially uncured state (i.e., the portion being substantially uncured or completely uncured). (See, Office Action, pg. 28, lines 3-11). Based on this interpretation of the claims, the Examiner has rejected the claims for allegedly introducing new matter. In response, Applicants have amended each of the claims for clarification purposes to recite that the entire pressure sensitive adhesive layer is in an uncured state. The amendments are supported in the Specification at, for example, page 20, line 1 to page 23, line 22, and Figures 3, 10-11. In particular, "the pressure sensitive adhesive layer 5 is formed of a plastic resin capable of being hardened (cured) by an external cause ... and is formed by spin coating or the like" (see, Specification, pg. 20, lines 7-11); and "the devices 3 are stripped from the temporary adhesion layer 2 before hardening (curing) the pressure sensitive adhesive layer 5" (see, Specification, page 22, line 22 to page 23, line 2).

In the Office Action, Claims 36, 38-39, 41-43, 45 and 47-51 are rejected under 35 U.S.C. §103(a) as being unpatentable over WO 02/084631 A1 to Hayashi et al. as evidenced by U.S. Patent No. 6,872,635 B2 to Hayashi et al. ("*Hayashi*") in view of U.S. Patent No. 5,426,342 to Nakamura et al. ("*Nakamura*") and U.S. Patent No. 6,613,610 to Iwafuchi et al. ("*Iwafuchi*"). In response, Applicants have further amended independent Claims 36, 39 and 41, as mentioned above. In view of the amendments and/or for at least the reasons set forth below, Applicants respectfully submit that the cited references fail to disclose or suggest each and every element of the present claims.

Currently amended independent Claims 36 and 41 recite, in part, a method comprising embedding a plurality of first devices into a pressure sensitive adhesive layer provided on a first substrate such that the plurality of first devices penetrate the surface of the pressure sensitive adhesive layer, the entire pressure sensitive adhesive layer being in an uncured state; embedding a plurality of second devices arranged on a second substrate into the pressure sensitive adhesive layer provided on the first substrate by positioning the first and second substrates in close proximity thereof such that the plurality of second devices arranged on the second substrate penetrate the surface of the pressure sensitive adhesive layer; and stripping the plurality of second devices from the second substrate while the entire pressure sensitive adhesive layer remains in an uncured state thereby holding both the plurality of first and second devices in an embedded state within the pressure sensitive adhesive layer. Similarly, currently amended independent Claim 39 recites, in part, a method comprising embedding devices arranged on a first substrate into a pressure sensitive adhesive layer provided on a second substrate by positioning the first and second substrates in close proximity thereof such that the devices arranged on the first substrate penetrate the surface of the pressure sensitive adhesive layer, wherein the entire pressure sensitive adhesive layer is in an uncured state and the devices are light emitting diodes; and stripping the devices from the first substrate while the entire pressure sensitive adhesive layer remains in an uncured state thereby holding the devices in an embedded and uncured state within the pressure sensitive adhesive layer.

An image display unit using light emitting devices such as light emitting diodes ("LEDs") is produced at a low cost by manufacturing a large number of LEDs from a single wafer. (See, Specification, paragraph 5, lines 1-4). Prior art display units are manufactured by

rearranging a plurality of devices formed on a device formation substrate onto an apparatus substrate. (See, Specification, paragraph 6, lines 1-4). The devices are first transferred from the device formation substrate to an adhesive layer provided on a temporary holding substrate and then transferred from the temporary holding substrate to the apparatus substrate. (See, Specification, paragraph 6, lines 4-9). In transferring the devices from the temporary holding substrate to the apparatus substrate, an adhesive layer is provided between the temporary holding substrate and the apparatus substrate to adhere the two substrates to each other. (See, Specification, paragraph 7, lines 1-7). Before stripping the two substrates from each other, the adhesive layer is cured while the devices are embedded in it. (See, Specification, paragraph 7, lines 7-16). Due to the strong adhesion between the two substrates, stripping the two substrates from each other may cause damage to the substrates. (See, Specification, paragraph 7, lines 7-13). Furthermore, because the adhesive layer is cured or hardened before stripping, the apparatus substrate is damaged such that it may be difficult to subsequently transfer devices onto the same apparatus substrate. (See, Specification, paragraph 7, lines 14-18).

Therefore, the presently claimed invention provide a method of manufacturing an image display unit by embedding devices arranged on a first substrate into a pressure sensitive adhesive layer provided on a second substrate and stripping the devices from the first substrate before the pressure sensitive adhesive layer is hardened or cured, and where the entire pressure sensitive layer remains uncured for successive device transfer steps. The plurality of devices are arranged on the first substrate by bringing the devices into contact with a temporary adhesion layer provided on the first substrate. (See, Specification, paragraph 12, lines 1-5). The plurality of devices are collectively embedded within the pressure sensitive adhesive layer by positioning the first and second substrates in close proximity to each other such that the plurality of devices penetrate the surface of the pressure sensitive adhesive layer. (See, Specification, paragraph 10, lines 6-10; Figure 3). Because the devices are embedded within the pressure sensitive adhesive layer rather than merely affixed to its surface, the devices may be mounted onto the second substrate independently of their shapes. (See, Specification, paragraph 10, lines 1-6). In addition, since the devices may be embedded within the pressure sensitive adhesive layer merely by positioning the two substrates in close proximity thereof, direct contact between the first and second substrates is not required and the force required to separate the first and second substrates

may be lowered, thereby reducing the possibility of damaging the substrates. (See, Specification, paragraph 14, lines 1-8). Furthermore, by stripping the devices from the first substrate while the entire pressure sensitive adhesive layer is still in an uncured state, the force required to separate the first and second substrates may be further reduced. (See, Specification, paragraph 10, lines 13-19). It is **also possible to embed additional devices** into the pressure sensitive adhesive layer by embedding the additional devices within the adhesive layer and stripping the additional devices from the substrate on which they are arranged **before any portions of the pressure sensitive adhesive layer is cured**. (See, Specification, paragraph 11, lines 1-6). In contrast, the cited references fail to disclose or suggest every element of the present claims because they disclose that **substantial portions of the adhesive layer** are cured during any device transfer step (but for a relatively small non-hardened region where devices are to be transferred), and they fail to disclose successive device transfer steps where previously transferred devices remain embedded in an uncured state.

In the primary *Hayashi* reference relied on in the Office Action, both of Figs. 2C and 10 show that only small portions of the adhesive layers are uncured prior to device transfer. As disclosed in *Hayashi*, "at the time of transfer of the devices 3a, it is required to partially irradiate the adhesive layer 7 with laser beams from the back surface side of the transfer substrate." (See, *Hayashi*, col. 11, lines 36-50). For example, "as shown in Fig. 3, only a portion, being in contact with the device 3a to be transferred, of the adhesive layer 7 is selectively irradiated with the laser beams L from the back surface side of the transfer substrate ... [a]s a result, only the heated region H of the adhesive layer ... is softened ... [a]t this time, portions, to which the other parts 8 have been adhesively bonded, of the adhesively layer 7 are not irradiated with the laser beams, and thereby these portions of the adhesive layer 7 are not softened." (See, *Hayashi*, col. 11, lines 50-65, emphasis added). Because substantially the entire area of the adhesive layer is in a cured state at the time of device transfer, *Hayashi* fails to disclose a device transfer step where other devices have been previously transferred and where the entire adhesive layer remains in an uncured state (i.e., where adjacent previously embedded devices are also embedded in an uncured state). Moreover, Fig. 11 of *Hayashi* (which is related to Fig. 10) shows curing the adhesive layer after the first transfer step, such that this layer does not remain in an uncured state. (See, *Hayashi*, col. 11, lines 36-50).

Similar to the *Hayashi* reference, Figs. 19-21 of the newly cited *Iwafuchi* reference show an adhesive layer that is only selectively/partially uncured prior to a device transfer step. (See, *Iwafuchi*, col. 26, line 60 to col. 27, line 39). Accordingly, because the references both show selective uncuring on just certain portions of the substrate such that all other devices previously transferred are in a cured state, neither *Hayashi* or *Iwafuchi* disclose or suggest that an entire adhesive layer remains in an uncured state through one or more different device transfer operations. The Office Action suggests that *Iwafuchi* discloses "a specific recitation of curing the adhesive surface of the transfer substrate after devices have been transferred." (See, Office Action, pg. 3). However, this does not speak to the presently claimed element of transferring devices onto an adhesive layer where the entire adhesive layer is in an uncured state, or to retransferring additional devices where the entire adhesive layer remains in an uncured state. As mentioned above, the presently claimed invention makes it possible to easily strip the substrate after the transfer of the devices, to lower the possibility of damaging the substrate, and to retransfer additional devices onto the same substrate where the adhesive layer remains in an uncured state. (See, Specification, pg. 4, lines 1-10).

Furthermore, the cited references fail to disclose or suggest stripping the devices from the first substrate while the entire pressure sensitive adhesive layer remains in an uncured state as recited, in part, by independent Claims 36, 39 and 41. *Hayashi* is entirely directed to selectively transferring devices from a first substrate to a second substrate by curing the portions of the adhesive layer corresponding to the devices. (See, *Hayashi*, Abstract, lines 5-19). The devices are transferred from the first substrate to the second substrate by placing the devices on the first substrate in press contact with the adhesive layer on the second substrate. (See, *Hayashi*, column 11, lines 26-33). The adhesive layer is then cooled and cured to fix the devices to the adhesive layer. (See, *Hayashi*, column 11, lines 40-49; column 12, lines 15-17). The first substrate is stripped from the second substrate after the adhesive layer is cured. (See, *Hayashi*, column 12, lines 45-49 ("After the devices 3*a* are fixed to the transfer substrate 6 via. . . curing due to cooling, the temporary holding substrate 4 is peeled from the transfer substrate 6")). Therefore, Hayashi fails to disclose stripping the devices from the first substrate while the pressure sensitive adhesive layer is in an uncured state.

The Office asserts that, although certain portions of *Hayashi* disclose curing prior to stripping the substrates from each, *Hayashi* also discloses transferring devices prior to complete curing of the adhesive layer. However, the portion of *Hayashi* relied on by the Examiner expressly states that "the heating is stopped to cool and cure the thermoplastic adhesive layer 82 so that the devices 3 are transferred to the transfer substrate 83 via the thermoplastic adhesive layer 82. The transfer substrate 83 is then peeled from the base substrate 1." (See, *Hayashi*, column 30, lines 23-28). Therefore, the adhesive layer is cured before stripping the substrates from each other. *Hayashi* also discloses further cooling the adhesive layer to room temperature after stripping in order to certainly fix the devices to the transfer substrate. (See, *Hayashi*, column 30, lines 28-30). Nowhere does *Hayashi* disclose that the adhesive layer is not completely cured prior to the final cooling step. In fact, because *Hayashi* discloses that the adhesive layer is cured prior to stripping, the final cooling step entails merely further cooling the adhesive layer to room temperature after it is cured. (See, *Hayashi*, column 30, lines 22-26). Furthermore, even if the adhesive layer is only partially cured prior to stripping the substrates from each other, *Hayashi* still fails to disclose stripping the devices from the first substrate while the pressure sensitive adhesive layer remains in an uncured state. For example, if the adhesive layer is partially cured, it is still partially hardened and not in an uncured state. As such, *Hayashi* fails to disclose stripping the devices from the first substrate while the pressure sensitive adhesive layer is in an uncured state as required, in part, by independent claims 36, 39 and 41 and Claims 38, 42-43, 45 and 47-51 that depend therefrom.

In addition, the cited references fail to disclose or suggest embedding devices arranged on a first substrate into an uncured pressure sensitive adhesive layer provided on a second substrate such that the devices arranged on the first substrate penetrate the surface of the uncured pressure sensitive adhesive layer as recited, in part, by currently amended independent Claims 36, 39 and 41. The Examiner asserts that *Hayashi* discloses embedding devices arranged on a first substrate into an uncured adhesive layer provided on a second substrate. (See, Office Action, page 2, lines 17-20). However, the portions of *Hayashi* relied on by the Examiner merely disclose bringing the devices into press contact with the adhesive layer and fixing the devices to the surface of the adhesive layer. (See, *Hayashi*, column 11, lines 26-30 and 41-48; column 30, lines 10-13 and 18-26; Figures 2D and 18A-18C). As clearly expressed in *Hayashi*, "[t]he thermoplastic

adhesive layer. . . is then cooled to be cured, to fix the devices 3 to the thermoplastic adhesive layer 82. That is to say, the softened thermoplastic layer 82 exhibits an adhesive force against the devices 3." (See, *Hayashi*, column 30, lines 18-22). Furthermore, Figures 2D and 18A-18C demonstrate that *Hayashi* only teaches fixing the devices to the surface of the adhesive layer. (See, *Hayashi*, Figures 2D and 18A-18C). Unlike *Hayashi*, the method of the present claims requires embedding the devices within the pressure sensitive adhesive layer rather than merely affixing the devices to its surface in order to reduce the force required to separate the first and second substrates and thereby decrease the possibility of damaging the substrates. (See, Specification, paragraph 10, lines 6-10; paragraph 14, lines 1-8; Figure 3). Nowhere does *Hayashi* disclose or suggest embedding the devices such that the devices arranged on the first substrate penetrate the surface of the uncured pressure sensitive adhesive layer. Furthermore, the Examiner relies on *Nakamura* merely for the disclosure of a heat sensitive and pressure sensitive adhesive layer. (See, Office Action, page 3, lines 8-12). Nowhere does *Nakamura* disclose or suggest embedding devices within a pressure sensitive adhesive layer such that the devices penetrate the surface of the uncured pressure sensitive adhesive layer. Therefore, Applicants respectfully maintain that the cited references fail to disclose or suggest embedding devices arranged on a first substrate into an uncured pressure sensitive adhesive layer provided on a second substrate such that the devices arranged on the first substrate penetrate the surface of the uncured pressure sensitive adhesive layer as required, in part, by the present claims.

Moreover, the cited references fail to disclose or suggest embedding devices arranged on a first substrate into an uncured pressure sensitive adhesive layer provided on a second substrate by positioning the first and second substrates in close proximity thereof. *Hayashi* is entirely directed to transferring devices from a first substrate to a second substrate by bringing the devices into press contact with the second substrate and fixing the devices to the surface of the adhesive layer provided on the second substrate. (See, *Hayashi*, column 11, lines 26-30 and 41-48; column 30, lines 10-13 and 18-26; Figures 2D and 18A-18C). Nowhere does *Hayashi* disclose or suggest embedding the devices arranged on a first substrate into an adhesive layer provided on a second substrate by merely positioning the first and second substrates in close proximity to each other. In fact, because *Hayashi* is entirely directed to fixing the devices on the first substrate to the surface of the adhesive layer, the first and second substrates must be brought

into press contact. (See, *Hayashi*, column 8, lines 61-66; column 10, lines 12-16 and 36-40; column 11, lines 9-14). Due to the strong adhesion between each of the first and second substrates and the adhesive layer, the force required to strip the first and second substrates from each other is great and may cause damage to the substrates. (See, Specification, paragraph 7, lines 5-14). Unlike *Hayashi*, the present claims are directed to embedding devices arranged on a first substrate into an adhesive layer provided on a second substrate merely by positioning the first and second substrates in close proximity to each other. Because direct contact between the two substrates is not necessary, the force required to strip the first and second substrates from each other is reduced. (See, Specification, paragraph 14, lines 1-8). Therefore, *Hayashi* fails to disclose or suggest embedding devices on a first substrate into an adhesive layer on a second substrate by positioning the first and second substrates in close proximity thereof. The Examiner relies on *Nakamura* merely for the disclosure of a heat sensitive and pressure sensitive adhesive layer. (See, Office Action, page 3, lines 11-15). Nowhere does *Nakamura* disclose or suggest embedding devices within a pressure sensitive adhesive layer by positioning the first and second substrates in close proximity thereof. As such, the cited references fail to disclose or suggest embedding devices arranged on a first substrate into an uncured pressure sensitive adhesive layer provided on a second substrate by positioning the first and second substrates in close proximity thereof in accordance with the present claims.

Accordingly, Applicants respectfully request that the rejection of Claims 36, 38-39, 41-43, 45 and 47-51 under 35 U.S.C. §103(a) to *Hayashi* and *Nakamura* be withdrawn.

In the Office Action, Claims 40 and 44-46 are rejected under 35 U.S.C. §103(a) as being unpatentable over WO 02/084631 A1 to Hayashi et al. as evidenced by *Hayashi* in view of *Nakamura*, and further in view of U.S. Patent Application No. 2003/0227253 to Seo et al. ("*Seo*") and *Iwafuchi*. As discussed previously, *Hayashi*, *Nakamura* and *Iwafuchi* fail to disclose or suggest: (1) embedding devices arranged on a first substrate into a pressure sensitive adhesive layer provided on a second substrate by positioning the first and second substrates in close proximity thereof such that the devices arranged on the first substrate penetrate the surface of the uncured pressure sensitive adhesive layer, where the entire pressure sensitive adhesive layer is in an uncured state; and (2) stripping the devices from the first substrate while the entire pressure sensitive adhesive layer remains in an uncured state as required, in part, by independent Claims

39 and 41 from which Claims 40 and 44-46 depend. The Examiner further relies on *Seo* merely for the disclosure of driving methods that include impressing a voltage on the devices through the first and second electric wirings. (See, Office Action, page 10, lines 1-7 and 13-19; page 11, lines 3-9). Thus, Applicants respectfully submit that *Seo* fails to remedy the deficiencies of *Hayashi*, *Iwafuchi* and *Nakamura*.

Accordingly, Applicants respectfully request that the rejection of Claims 40 and 44-46 under 35 U.S.C. §103(a) to *Hayashi*, *Nakamura*, *Seo* and *Iwafuchi* be reconsidered and withdrawn.

In the Office Action, Claims 36, 38-39, 41-43, 45 and 47-51 are rejected under 35 U.S.C. §103(a) as being unpatentable over WO 02/084631 A1 to Hayashi et al. as evidenced by *Hayashi* in view of *Nakamura*, and further in view of U.S. Patent No. 6,700,185 to Kawai et al. ("*Kawai*"). Moreover, Claims 40 and 44-46 are rejected under 35 U.S.C. §103(a) as being unpatentable over WO 02/084631 A1 to Hayashi et al. as evidenced by *Hayashi* in view of *Nakamura*, and further in view of U.S. Patent Application No. 2003/0227253 to Seo et al. ("*Seo*") and *Kawai*.

Kawai is relied on for the alleged disclosure of an adhesive device transfer method that includes hardening an adhesive layer 7 after a temporary substrate has been stripped from the devices. Even assuming that *Kawai* discloses such a feature and that the references are properly combinable, *Kawai* fails to cure the deficiencies of *Hayashi* and *Nakamura*, as discussed above. For example, *Hayashi* does not disclose embedding a plurality of first devices into a pressure sensitive adhesive layer, where the entire pressure sensitive layer is in an uncured state.

Accordingly, Applicants respectfully request that the rejection of Claims 36, 38-39, 41-43, 45 and 47-51 under 35 U.S.C. §103(a) over *Hayashi*, *Nakamura* and *Kawai* and that the rejection of Claims 40 and 44-46 under 35 U.S.C. §103(a) to *Hayashi*, *Nakamura*, *Seo* and *Kawai* be reconsidered and withdrawn.

For the foregoing reasons, Applicants respectfully submit that the present application is in condition for allowance and earnestly solicit reconsideration of same.

Respectfully submitted,

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